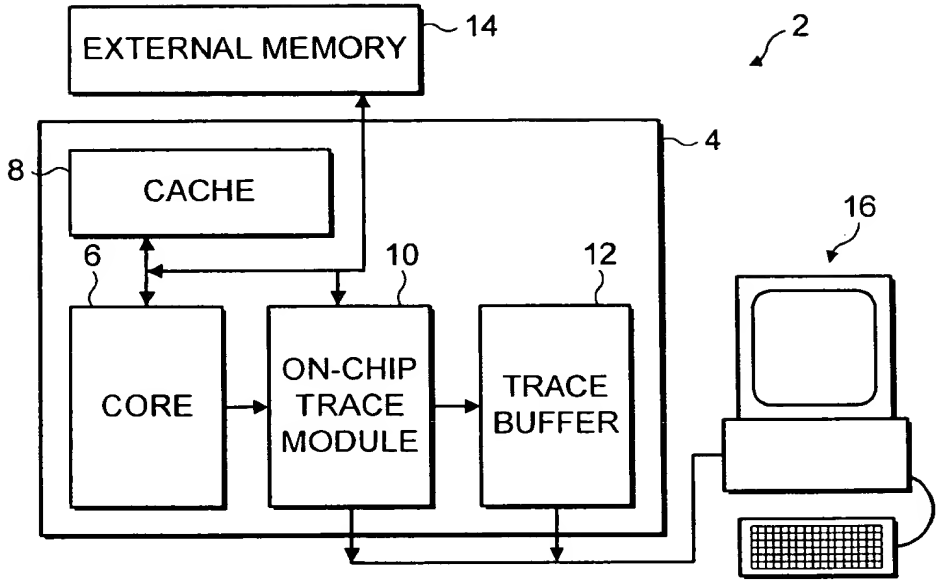

FIG. 1

	INST	HIT / MISS	DATA	
18	LDR[Rm]	HIT	DATA[Rm]	
	MOV	N / A	—	
	CMP	N / A	—	
	:	:	:	
	:	:	:	
20	LDR[Rm]	MISS	—	VARIABLE DELAY
	MOV	N / A	—	
	CMP	N / A	DATA[Rm]	
	:	:	:	
	:	:	:	
22	LDR[R1]	MISS	—	
24	LDR[R2]	MISS	—	
	MOV	N / A	—	
	CMP	N / A	28 DATA[R2]	MISSED DATA RETURNED OUT OF OTDER
	ADD	N / A	26 DATA[R1]	

FIG. 2

INSTRUCTION TRACE STREAM	DATA TRACE STREAM
:	:
:	:
30 ~ LDR[R1] - - MISS	32 ~ DATA PLACE HOLDER TAG 1
MOV	—
CMP	—
34 ~ LDR[R2] - - HIT	36 ~ DATA[R2]
38 ~ LDR[R3] - - MISS	40 ~ DATA PLACE HOLDER TAG 2
ADD	—
MOV	42 ~ LATE DATA TAG 2[R3]
SUB	44 ~ LATE DATA TAG 1[R1]
:	:
:	:

FIG. 3

INSTRUCTION TRACE STREAM	DATA TRACE STREAM
:	:
:	:
46 ~ LDR[R1] - - MISS	48 ~ DATA PLACE HOLDER 0 PENDING
CMP	—
ADD	—
LDR[R2] - - HIT	DATA[R2]
50 ~ LDR[R3] - - MISS	52 ~ DATA PLACE HOLDER 1 PENDING
SUB	54 ~ LATE DATA[R1]
MOV	—
56 ~ LDR[R4] - - MISS	58 ~ DATA PLACE HOLDER 1 PENDING
CMP	LATE DATA[R3]
MOV	LATE DATA[R4]
:	:
:	:

FIG. 4

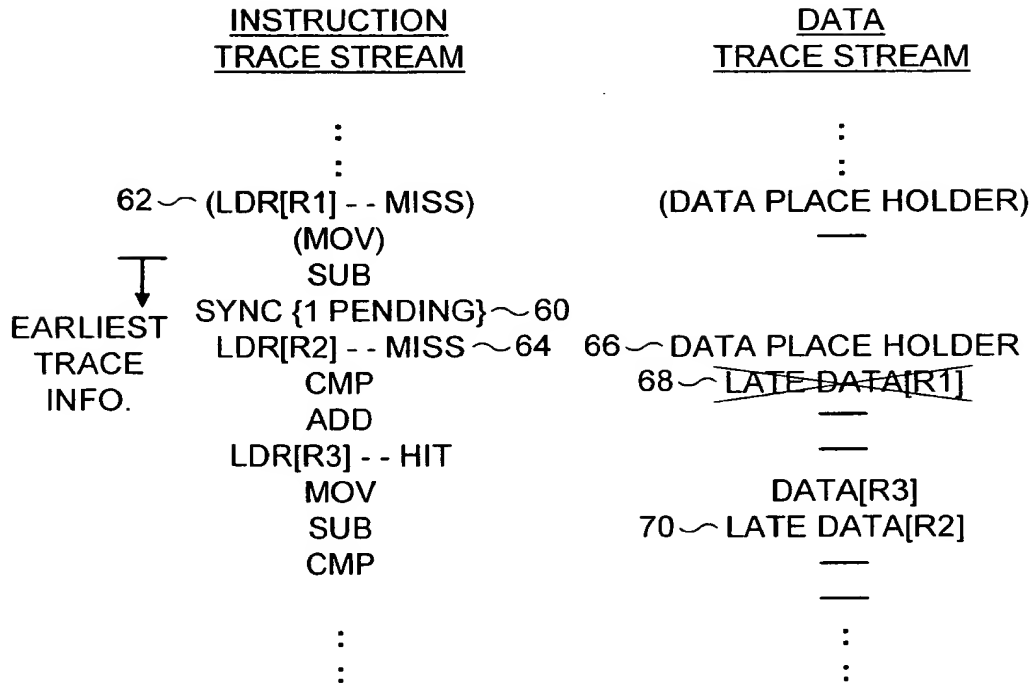
INSTRUCTION TRACE STREAM
DATA TRACE STREAM
62
(LDR[R1] - - MISS)
(MOV)
SUB
SYNC {1 PENDING}
60
LDR[R2] - - MISS
64
CMP
ADD
LDR[R3] - - HIT
MOV
SUB
CMP
EARLIEST TRACE INFO.
(DATA PLACE HOLDER)
66
DATA PLACE HOLDER
68
LATE DATA[R1]
DATA[R3]
70
LATE DATA[R2]

FIG. 5

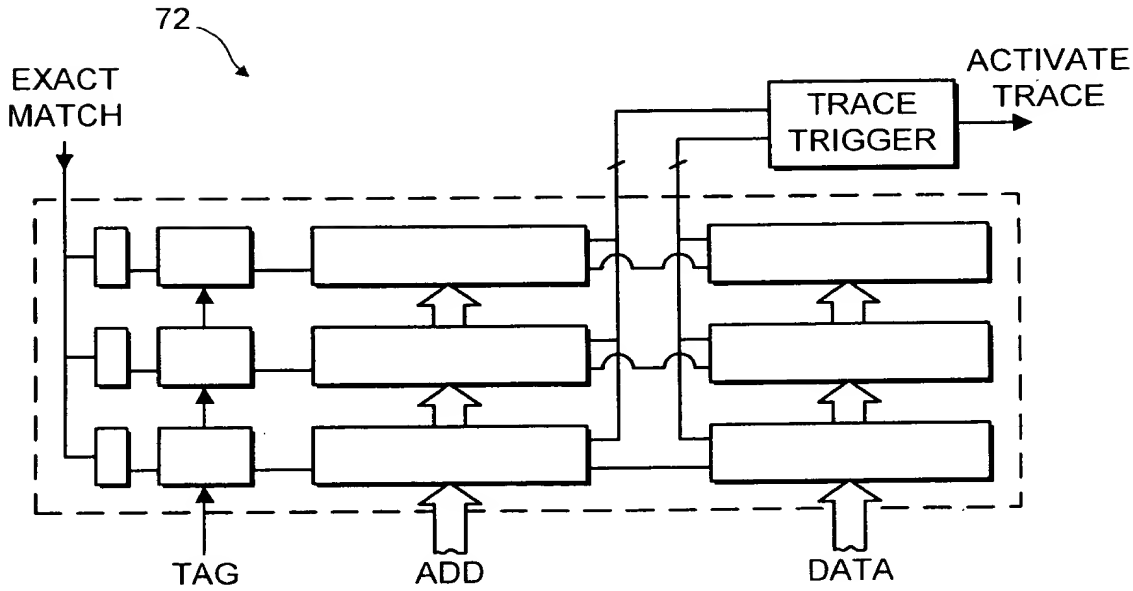
72
EXACT MATCH
TRACE TRIGGER
ACTIVATE TRACE
TAG
ADD
DATA

FIG. 6

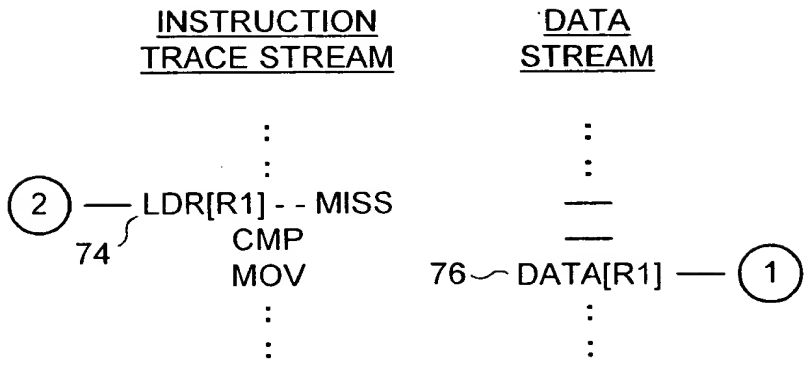

FIG. 7

EXACT MATCH	ADD MATCH	DATA MATCH	TRACE ACTIVATION POINT
✓	✓	✓	(1)
✓	✓	✗	NONE
✗	✓	✓	(2)
✗	✓	✗	(2)

FIG. 8

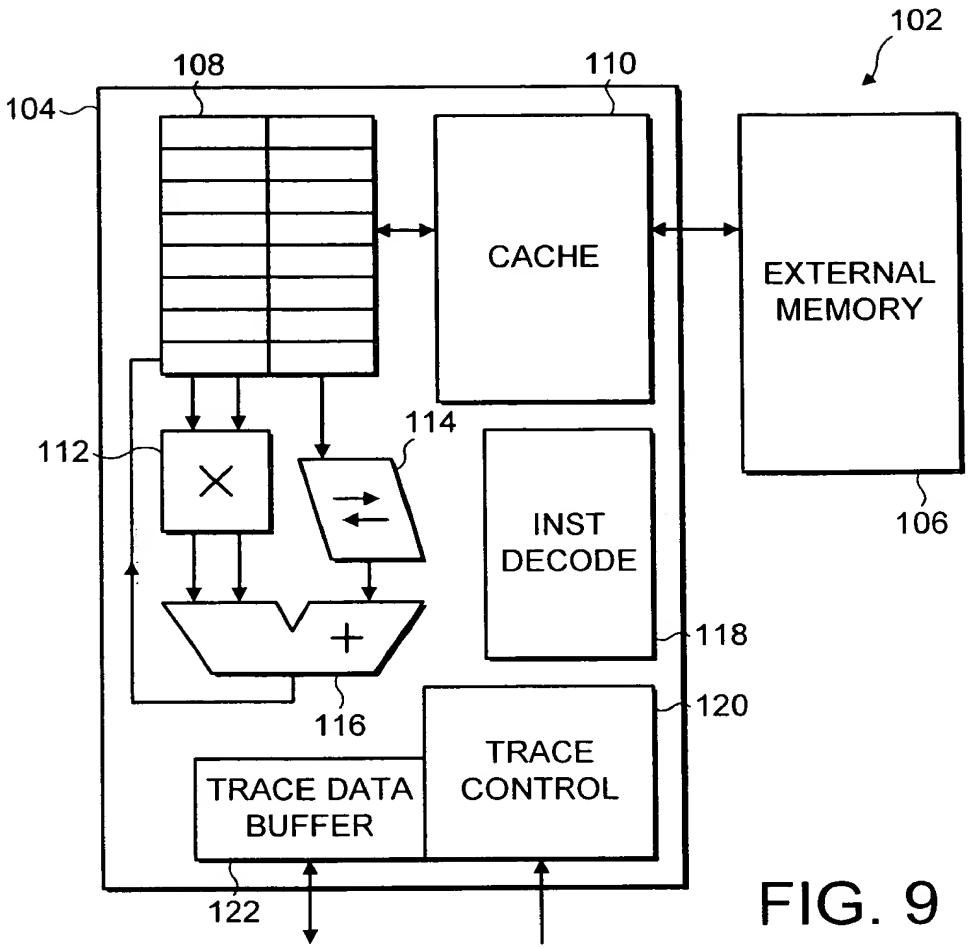
102
108
110
104
CACHE
EXTERNAL MEMORY
114
112
INST DECODE
106
118
116
120
TRACE CONTROL
TRACE DATA BUFFER
122

FIG. 9

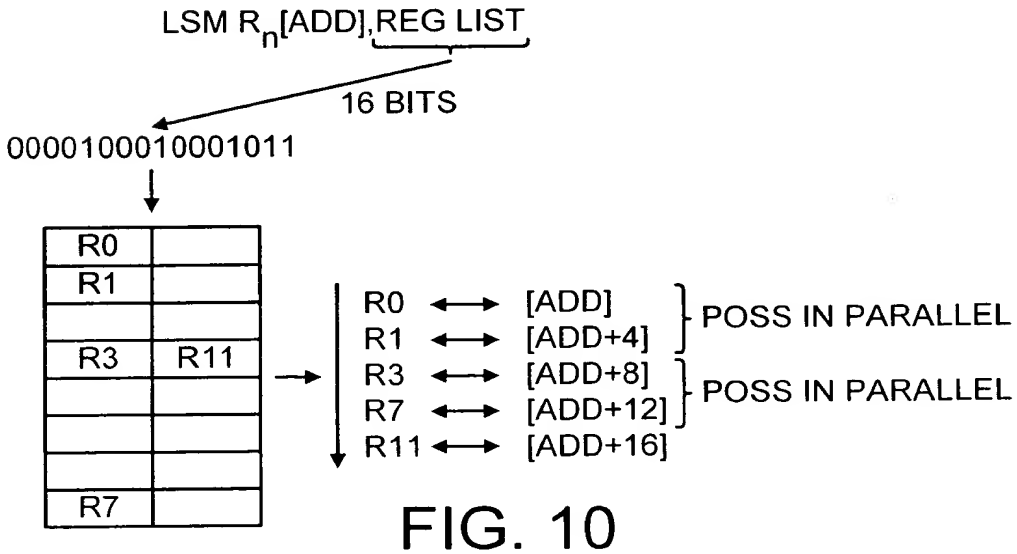
LSM Rn[ADD],REG LIST
16 BITS
0000100010001011
R0
R1
R3
R11
R7
R0 ↔ [ADD]
R1 ↔ [ADD+4]
POSS IN PARALLEL
R3 ↔ [ADD+8]
R7 ↔ [ADD+12]
POSS IN PARALLEL
R11 ↔ [ADD+16]

FIG. 10

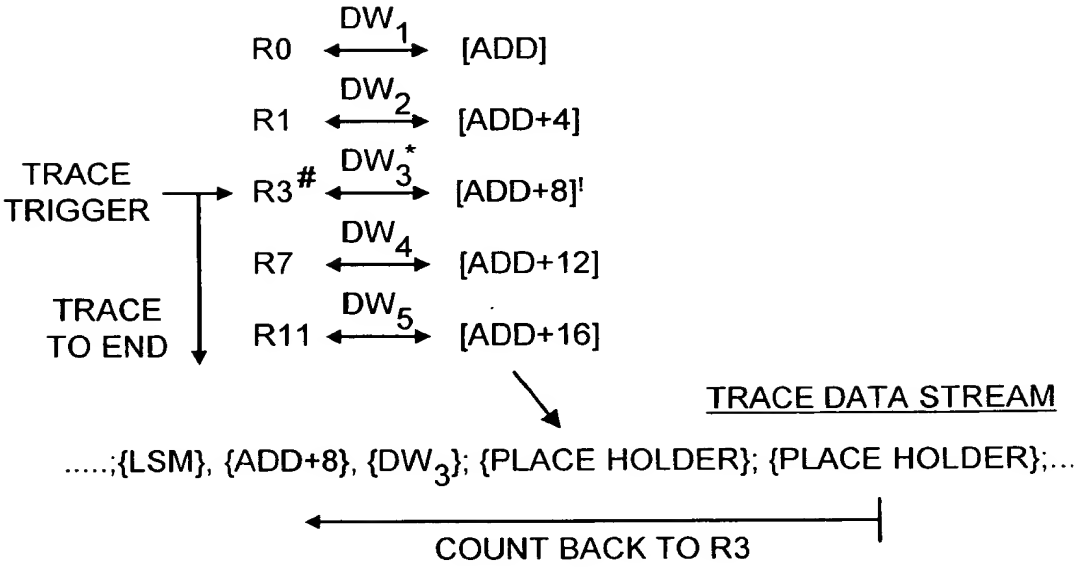
R0
DW1
[ADD]
R1
DW2
[ADD+4]
TRACE TRIGGER
R3#
DW3*
[ADD+8]!
R7
DW4
[ADD+12]
TRACE TO END
R11
DW5
[ADD+16]
TRACE DATA STREAM
.....;{LSM}, {ADD+8}, {DW3}; {PLACE HOLDER}; {PLACE HOLDER};...
COUNT BACK TO R3

FIG. 11

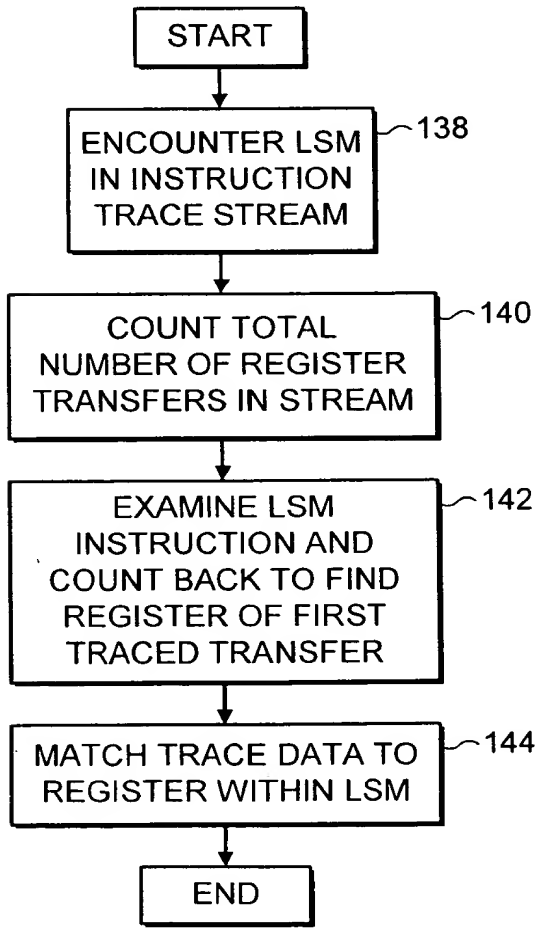
START
ENCOUNTER LSM IN INSTRUCTION TRACE STREAM
138
COUNT TOTAL NUMBER OF REGISTER TRANSFERS IN STREAM
140
EXAMINE LSM INSTRUCTION AND COUNT BACK TO FIND REGISTER OF FIRST TRACED TRANSFER
142
MATCH TRACE DATA TO REGISTER WITHIN LSM
144
END

FIG. 13

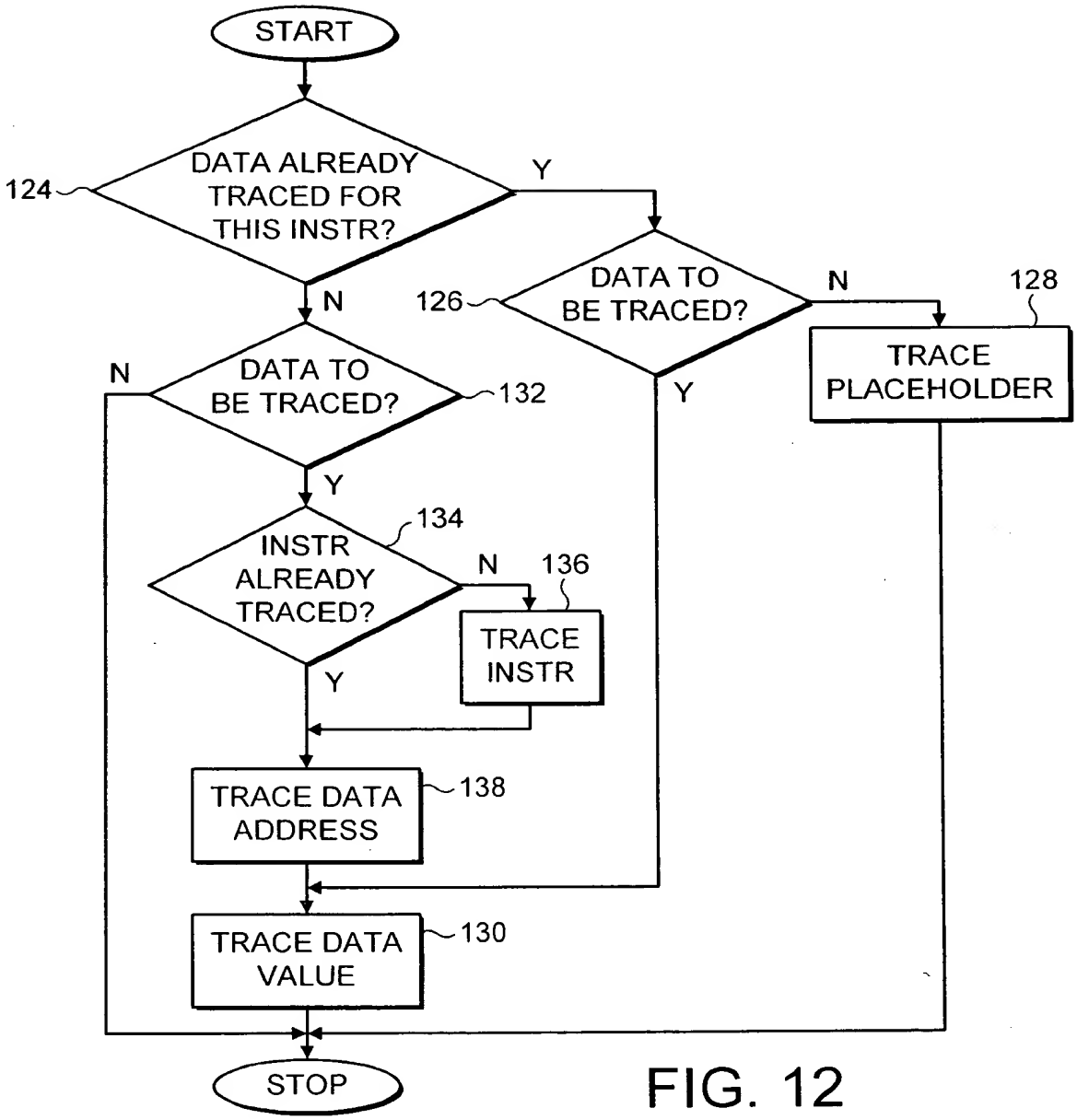
START
DATA ALREADY TRACED FOR THIS INSTR?
124
Y
N
DATA TO BE TRACED?
126
N
128
TRACE PLACEHOLDER
Y
N
DATA TO BE TRACED?
132
Y
INSTR ALREADY TRACED?
134
N
136
TRACE INSTR
Y
TRACE DATA ADDRESS
138
TRACE DATA VALUE
130
STOP

FIG. 12